FORM PTO-1390U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE (REV 10-94) **TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371**		ATTORNEY'S DOCKET NUMBER 740-63 U.S. APPLICATION NO. (If known, see 37 CFR 1.5) 09/980042
INTERNATIONAL APPLICATION NO. PCT/DE00/01557	INTERNATIONAL FILING DATE 18 May 2000 (18.05.00)	PRIORITY DATE CLAIMED 18 May 1999 (18.05.99)
TITLE OF INVENTION METHOD AND ARRANGEMENT FOR CONTROLLING FACILITIES AND/OR PROCESSES ADDITIONALLY USING MOBILE COMMUNICATION NETWORKS		
APPLICANT(S) FOR DO/EO/US PETER BRUNE et al.		

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. X This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ___ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing 35 U.S.C. 371.
3. X This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. X A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.

5. X A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. X is transmitted herewith (required only if not transmitted by the International Bureau).and
   b. X has been transmitted by the International Bureau.
   c. ___ is not required, as the application was filed in the United States Receiving Office (RO/US)

6. X A translation of the International Application into English (35 U.S.C. 371(c)(2)), (verified) incorporating substitute pages 3, 3a, 3b, 9, 10, 11 filed under Article 34.
7. X Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ___ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ___ have been transmitted by the International Bureau.
   c. ___ have not been made; however, the time limit for making such amendments has NOT expired.
   d. X have not been made and will not be made.

8. ___ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. X An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). (UNSIGNED)
10. ___ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ___ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ___ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. X A FIRST preliminary amendment.
    ___ A SECOND or SUBSEQUENT preliminary amendment.

14. X A substitute specification.

15. ___ A change of power of attorney and/or address letter.

16. X Other items or information:
    a. Request (PCT/RO/101) (6 pages)
    b. International Preliminary Examination Report in German language (PCT/IPEA/409) (6 pages)
    c. Written Opinion (10 pages)

U.S. APPLICATION NO. (If known, see 37 CFR 1.5) 09/980042	INTERNATIONAL APPLICATION NO. PCT/DE00/01557	ATTORNEY'S DOCKET NO. 740-63

17. X The following fees are submitted:	CALCULATIONS	PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a) (2) paid to USTPO and International Search Report not prepared by the EPO or JPO $ 1,040.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO $ 890.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International search fee (37 CFR 1.445(a)(2) paid to USPTO $ 740.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) $ 710.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) $ 100.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 890	
Surcharge of $130.00 for furnishing the oath or declaration later than _ 20 _ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total Claims	31 – 20	11	x $ 18.00	$ 198	
Independent Claims	2 - 3	0	x $ 84.00	$	
Multiple dependent claim(s) (if applicable)			+ $260.00	$	
TOTAL OF ABOVE CALCULATIONS =				$ 1088	
☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by ½				$	
SUBTOTAL =				$ 1088	
Processing fee of $130. for furnishing the English translation later than _ 20 _ 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +				$	
TOTAL NATIONAL FEE =				$ 1088	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property +				$	
TOTAL FEES ENCLOSED				$ 1088	
				Amount to be: refunded	$
				charged	$

a. X A check in the amount of $ 1,088 to cover the above fees is enclosed.
b. ___ Please charge my Deposit Account No. _____ in the amount of $ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.
c. X The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 02-0460 . A duplicate copy of this sheet is enclosed.
d. ___ Fees are charged to a credit card. **WARNING**: Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

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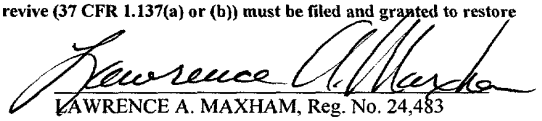


LAWRENCE A. MAXHAM, Reg. No. 24,483

IN THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US)

CONCERNING A FILING UNDER 35 U.S.C. 371

In re		
Applicant	:	PETER BRUNE et al.
U.S. Application No.	:	(Unknown)
International Application No.	:	PCT/DE00/01557
International Filing Date	:	18 May 2000 (18.05.00)
For	:	METHOD AND ARRANGEMENT FOR CONTROLLING FACILITIES AND/OR PROCESSES ADDITIONALLY USING MOBILE COMMUNICATION NETWORKS
Priority Data	:	DE 199 22 667.9
Filed	:	18 May 1999 (18.05.99)
Our Attorney/Docket Reference	:	740-63

PRELIMINARY AMENDMENT

The specification has been translated, revised for idiomatic English, and amended by adding headings and an abstract, and the claims have been revised for proper US form. Accordingly, a substitute specification is submitted herewith to incorporate those changes.

Respectfully Submitted

PETER BRUNE ET AL.

Lawrence A. Maxham
Registration No. 24,483

METHOD AND ARRANGEMENT FOR CONTROLLING FACILITIES AND/OR PROCESSES ADDITIONALLY USING MOBILE COMMUNICATION NETWORKS

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] This invention relates to a method and an arrangement for controlling installations and/or processes in which parts of an existing mobile communication network are additionally used. In addition to the functioning of the mobile communication network, which is defined by standards, control information and signal information are transmitted over parts of the mobile communication network to permit execution of special applications in accordance with this invention. The invention may be used for the control of automatic vending machines by the user of the vending machine, or remote maintenance or remote transmission of measurement data from installations to be monitored.

2. Discussion of Related Art

[0002] For a long time, it has been known that more or less successful experiments or projects have been conducted using the general GSM network infrastructure for system options. In particular, the following types of applications are known:

a) Micro-Payment Options: A mobile wireless customer uses a mobile station for cashless payment. The payment is made by sending an

(authenticated) order from the mobile station to a central micro-payment office. The amounts that fall due are settled either as part of the mobile wireless bill or with a special bill for all micro-payment transactions; and

b) Data Use Without a Standard GSM Subscription: This involves primarily applications in the area of monitoring, which transmit smaller volumes of data only occasionally. For these applications, the use of a standard GSM subscription, including a calling number, is not economical. An example is an automatic beverage vending machine, which sends instructions to the operator to restock it when the stock level drops below a defined threshold.

[0003] Regarding a) above, a GSM-based micro-payment option should meet the following requirements: payment must be made rapidly; the option must be reliable with regard to both availability and quality, as well as in the area of security; network resources must not be heavily burdened; the man-machine interface (MMI) must be simple; and it should be possible to use terminal devices available on the market.

[0004] Regarding b) above, a data application without a standard GSM subscription should meet the following requirements: data transmission must be rapid; the option must be reliable in the area of availability and quality, as well as security; network resources must not be heavily burdened; and in particular, there should be no allocation of calling numbers to the mobile applications.

[0005] For these requirements, a mobile communication network in the traditional sense cannot be used satisfactorily because too many network resources are occupied and therefore these applications are not economically acceptable.

[0006] In this connection, U.S. patent 5,752,188 describes a method of information exchange with the additional use of a mobile communication network, wherein an exchange of information takes place between the information flows within the GSM mobile communication network and a dedicated network, and information elements of the standardized Unstructured Supplementary Service Data (USSD) signaling protocols of the mobile communication network are used for this exchange of information. For this purpose, a USSD processing device is provided in a network element of the mobile communication network to receive USSD messages and to relay them transparently to the dedicated network over a data device. This puts a relatively high burden on the network resources, because the usual network elements such as MSC/VLR or HLR are used for the information transmission.

[0007] International Patent Application WO 97/41654 describes an information transmission system in which information coming from various information sources is received by a communication distribution center and processed on an individual basis for subscribers of a mobile communication network. The information is then sent by means of short messages service (SMS) to the subscriber using the infrastructure of the mobile communication network which is needed for the SMS transfer.

[0008] International Patent Application WO 97/19568 discloses a mobile parking system for subscribers of a mobile communication system based on the short message service (SMS) of a mobile communication system. To use a parking place that requires payment, the subscriber sends a check-in message to a parking place administration and then sends a check-out message on leaving the parking place. The messages are sent by entering and sending a short message SMS. The parking fees

incurred are then posted by the parking place administration. Here again, the messages are sent by using the infrastructure of the mobile communication network which is needed for the SMS transmission.

[0009] Finally, U.S. patent 5,351,235 discloses a method of transmitting information in a service-integrating communications network such as ISDN or GSM. There is an exchange of information here between two terminals of the network in such a way that on inquiry by the first terminal, the second terminal automatically generates a response message and sends it back to the first terminal. The information is transmitted by using the entire infrastructure of the communication network, preferably over the SMS, for example.

SUMMARY OF THE INVENTION

[0010] One object of this invention is to provide a method which offers a technical solution that reduces the overall technical complexity and expenditure for applications where known control methods and transmission methods which are carried out with the help of a mobile communication network.

[0011] An advantage of this invention is derived first, from the fact that, due to the partial additional use of an existing mobile communication network, the demand for investment for the special application is lower than in the case of an exclusive option. In addition, the cost burden on the mobile communication network is also reduced due to the additional use. When using commercial terminals for the special functions, which is the desired goal, acceptance by the user of the mobile communication network for such special services is especially high. Examples of the use of the idea of this invention are given below.

[0012] When using a GSM network, communication from the mobile terminal or the corresponding application to the mobile communication network takes place by using information elements of the standardized signaling protocols. The messages or information elements used are filtered out of the signaling at suitable locations in the GSM network and transferred to a dedicated network (for example, TCP/IP). In the dedicated network (hereinafter referred to as an "applications network"), the message or information elements are relayed further to an applications computer. It is also conceivable to use a central applications computer which covers certain regions or is responsible for certain applications. The applications computer can signal a response back to the mobile terminal within the same dialog. In addition, the applications computer can autonomically establish a dialog with the mobile terminal.

[0013] Essentially all protocol elements, which are filled with any desired information by the terminal and can then be transmitted to the network, are suitable for transport from the mobile terminal to the network. The Unstructured Supplementary Service Data procedure (USSD) which permits communication between a mobile wireless subscriber and the GSM network independently of calling is especially suitable for use in this invention. In contrast with the standardized USSD procedure, it is proposed here that the USSD message be filtered out of the signaling flow to suitable locations.

BRIEF DESCRIPTION OF THE DRAWING

[0014] The objects, advantages and features of the invention will be more readily appreciated from the following detailed description, when read in conjunction with the accompanying drawing, in which;

Fig. 1 is a schematic arrangement of one embodiment of the invention;

Fig. 2 shows the operation of the message filter used in accordance with one embodiment of the invention;

Fig. 3 is a schematic arrangement of another embodiment of the invention for devices and processes in a public parking place; and

Fig. 4 is a schematic of yet another embodiment of the invention for control of a beverage vending machine.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0015] With reference to Fig. 1, the signaling flow is not relayed transparently at the filter points, but instead the message and information elements affected are filtered out and inserted with a multiplexer according to the protocol. This object is implemented with a filter (message filter), as illustrated in Fig. 2.

[0016] However, the filter function need not take place at all levels of the protocol. Thus, for example, it is not absolutely necessary to filter out general functions such as identification, authentication and encryption, but instead these functions can be carried out as usual to then filter out the authenticated dialog.

[0017] Two filter points are logically possible, first on the A interface and secondly, on the MAP interface (Fig. 1). The essential features, as well as their advantages and disadvantages, are summarized below.

[0018] Advantages of the A Interface are: minimal burden on the GSM network infrastructure; no unnecessary time loss due to the processing time in the network; place-based data of the mobile terminal is available and can thus be used in

the application; and the number of the A interface in the network is relatively large so that the number of message filters is large.

[0019] Advantages of the MAP interface are: the filter function is also engaged for subscribers roaming outside the home network; and the number of MAP interfaces is low relative to the number of A interfaces.

Overall arrangement

[0020] With an appropriate installation of message filters, the arrangement can be constructed and operated with area coverage (at all A interfaces or at all MAP interfaces with the Home Location Register (HLR)), regionally (selected A interfaces), or depending on IMSI region (selected MAP interfaces with the HLR).

[0021] In all three cases, the installed message filters are connected to one or more applications computers via the applications network. In the applications computer, the messages are received, and analyzed, the required actions initiated and the corresponding acknowledgment is sent back to the mobile terminal. This will now be illustrated on the basis of two examples.

[0022] Fig. 3 shows the use of this invention for devices and processes on a public parking place. As an alternative to the usual payment of the parking fee at an automatic parking meter, the fees can also be paid via mobile wireless. To do so, the automobile driver sends a check-in message when the driver occupies the parking place and sends a check-out message when leaving the parking place. These messages are sent by entering and sending a USSD message (string of digits with "#" as the last character). The message includes a string of digits for "parking place: check-in message" and "parking place: check-out message" as well as the parking place number. The message is picked up by the message filter at the A interface and is

transmitted together with the IMSI to the applications computer for identification of the customer and the cell ID for determination of the location.

[0023] The determination of location and the parking place number transmitted define uniquely a certain parking place in the service region. With the "check-in message" the parking place in question is listed with the status "properly occupied" in the applications computer. With the "check-out message" the parking place is released again, the parking time is determined and the amount due is sent to an accounting system (for example, the mobile wireless accounting system). During the parking time, parking monitors can determine by inquiry to the applications computer whether the parking place is "properly occupied."

[0024] Fig. 4 shows as another example the use of the idea of this invention for control of a beverage vending machine. A (simplified) GSM telephone is installed in the beverage vending machine, which has been set up (publicly). In contrast with normal GSM telephones, this instrument must support only the USSD function. In principle, the IMSI used can also be used for other applications and automatic machines. It is not necessary to assign a calling number (address message) (MSISDN).

[0025] As soon as the stock level of a beverage drops below a predefined threshold, the beverage vending machine sends a USSD message. This message contains a code for the operator of the vending machine, a unique identifier of the vending machine and a code for the beverage in question. The message is picked up by the message filter on the MAP interface to the HLR and sent to the applications computer. The operator of the vending machine is identified in the applications computer and notified.

Alternative Embodiment:

[0026] For the application case of "data use without a standard GSM subscription" (Example 2), a standard HLR can be omitted and instead a mini-HLR/AC function (for example, location update and send authentication parameter) can be integrated into the message filter. IMSI can be reused for other vending machines and applications. It is not necessary to assign a calling number (MSISDN).

[0027] Although the invention has been described with reference to the embodiments disclosed above, it should be understood that the invention is no so limited. Accordingly, the invention is limited only by the appended claims and their equivalents.

CLAIMS

What is claimed is:

1. A method of controlling installations and/or processes in which parts of an existing mobile communication network are used, comprising an exchange of information taking place between the information flows within the mobile communication network and a dedicated network, and information elements of the standardized signaling protocols of the mobile communication network, wherein the respective information elements are not relayed transparently at suitable interfaces in the mobile communication network, but instead are filtered out of the signaling by a filter method and are transferred to the dedicated network, wherein the information elements coming from the dedicated network are inserted into the signaling.

2. The method according to claim 1, wherein the exchange of information takes place by inserting response signals in the form of information elements into the mobile communication signaling.

3. The method according to claim 1, wherein the content of at least one of said information elements is defined by a terminal involved in the mobile communication.

4. The method according to claim 2, wherein the content of at least one of said information elements is defined by a terminal involved in the mobile communication.

5. The method according to claim 1, wherein the A interface of a GSM or UMTS mobile communication network is used as the interface.

6. The method according to claim 2, wherein the A interface of a GSM or UMTS mobile communication network is used as the interface.

7. The method according to claim 3, wherein the A interface of a GSM or UMTS mobile communication network is used as the interface.

8. The method according to claim 1, wherein the MAP interface of a GSM or UMTS mobile communication network is used as the interface.

9. The method according to claim 2, wherein the MAP interface of a GSM or UMTS mobile communication network is used as the interface.

10. The method according to claim 3, wherein the MAP interface of a GSM or UMTS mobile communication network is used as the interface.

11. The method according to claim 4, wherein the MAP interface of a GSM or UMTS mobile communication network is used as the interface.

12. The method according to claim 1, wherein the information exchanged includes at least a subscriber identification.

13. The method according to claim 2, wherein the information exchanged includes at least a subscriber identification.

14. The method according to claim 3, wherein the information exchanged includes at least a subscriber identification.

15. The method according to claim 4, wherein the information exchanged includes at least a subscriber identification.

16. The method according to claim 5, wherein the information exchanged includes at least a subscriber identification.

17. The method according to claim 1, wherein the information exchanged includes at least a location identification.

18. The method according to claim 2, wherein the information exchanged includes at least a location identification.

19. The method according to claim 3, wherein the information exchanged includes at least a location identification.

20. The method according to claim 4, wherein the information exchanged includes at least a location identification.

21. The method according to claim 5, wherein the information exchanged includes at least a location identification.

22. The method according to claim 6, wherein the information exchanged includes at least a location identification.

23. The method according to claim 1, wherein the exchange of information takes place through a unit of the mobile communication network which has at least the function of a home location register and/or an authentication center.

24. The method according to claim 2, wherein the exchange of information takes place through a unit of the mobile communication network which has at least the function of a home location register and/or an authentication center.

25. The method according to claim 3, wherein the exchange of information takes place through a unit of the mobile communication network which has at least the function of a home location register and/or an authentication center.

26. The method according to claim 4, wherein the exchange of information takes place through a unit of the mobile communication network which has at least the function of a home location register and/or an authentication center.

27. The method according to claim 5, wherein the exchange of information takes place through a unit of the mobile communication network which has at least the function of a home location register and/or an authentication center.

28. The method according to claim 6, wherein the exchange of information takes place through a unit of the mobile communication network which has at least the function of a home location register and/or an authentication center.

29. The method according to claim 7, wherein the exchange of information takes place through a unit of the mobile communication network which has at least the function of a home location register and/or an authentication center.

30. An arrangement for controlling installations and/or processes, comprising parts of an existing mobile communication network being used for the transmission of the respective data, and arrangements are provided for the exchange of information between a dedicated network and elements of the mobile communication network which are participating in the information flow within the mobile communication network, with at least one coupling device being provided to permit an exchange of information between at least one location in the mobile communication network and a location in the dedicated network, wherein said

coupling device has devices which can directly or indirectly select information elements from the information flow of the mobile communication network in a controlled manner that conforms to the protocol or it can directly or indirectly insert information elements into the information flow of the mobile communication network in a controlled manner or it can replace corresponding elements of the information flow of the mobile communication network.

31. The arrangement according to claim 30, wherein as a coupling point of the mobile communication network to the dedicated network in the mobile communication network, a unit is provided which has at least the function of a home location register and/or an authentication center.

METHOD AND ARRANGEMENT FOR CONTROLLING FACILITIES AND/OR PROCESSES ADDITIONALLY USING MOBILE COMMUNICATION NETWORKS

ABSTRACT OF THE DISCLOSURE

An apparatus for controlling facilities and/or processes using existing parts of a mobile communication network, along with additional parts. Arrangements are provided for the exchange of information between a dedicated network and elements of the mobile communication network. At least one coupling device is provided to permit an exchange of information. The coupling device has further devices which can directly or indirectly select information elements from the information flow of the mobile communication network in a controlled manner, or it can directly or indirectly insert information elements into the information flow of the mobile communication network in a controlled manner, or it can replace corresponding elements of the information flow of the mobile communication network. Methods are also provided herein. The apparatus and method allows, for example, payment for public parking, or inventory control for a vending machine using a mobile phone.

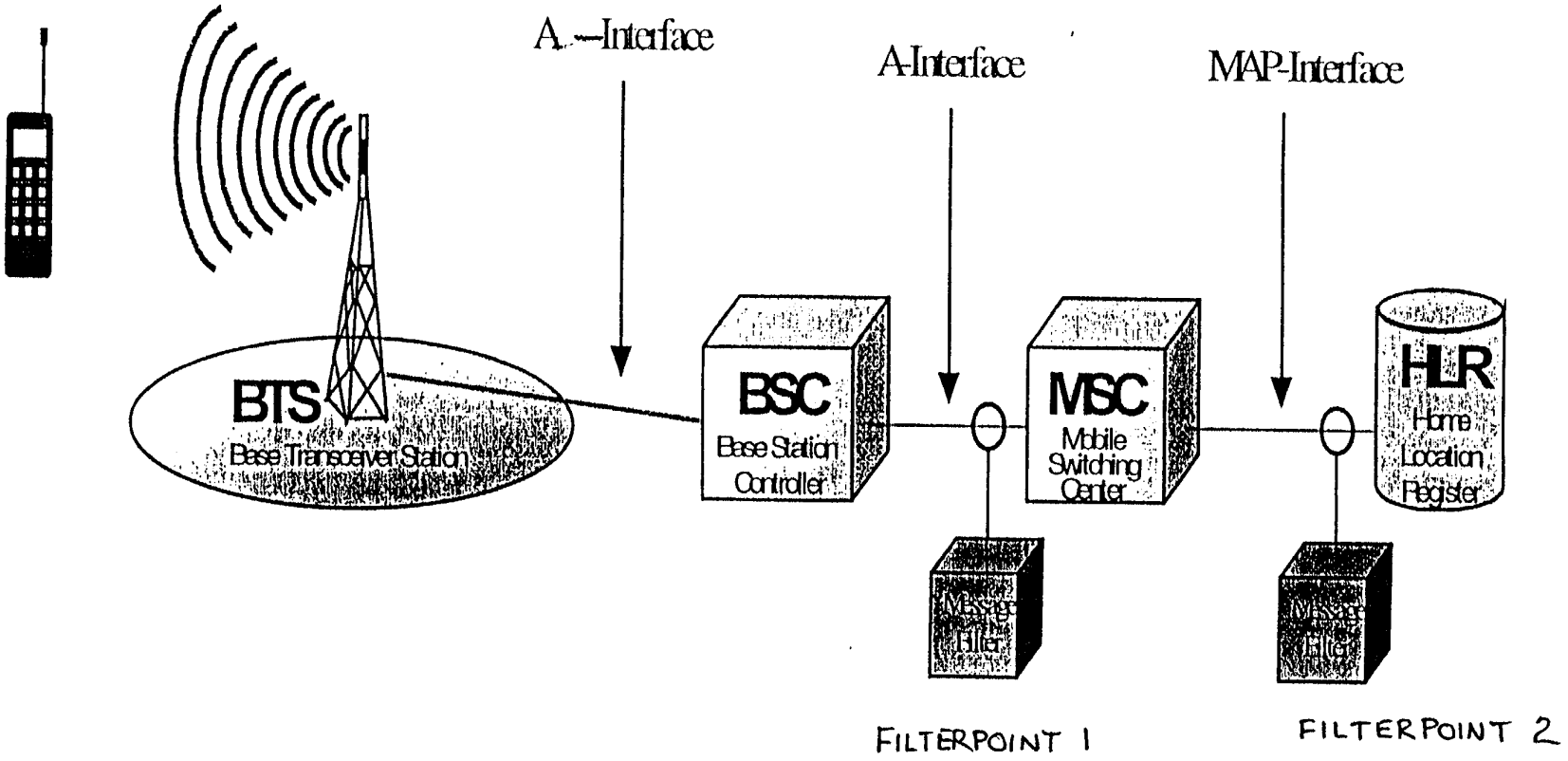


Fig. 1

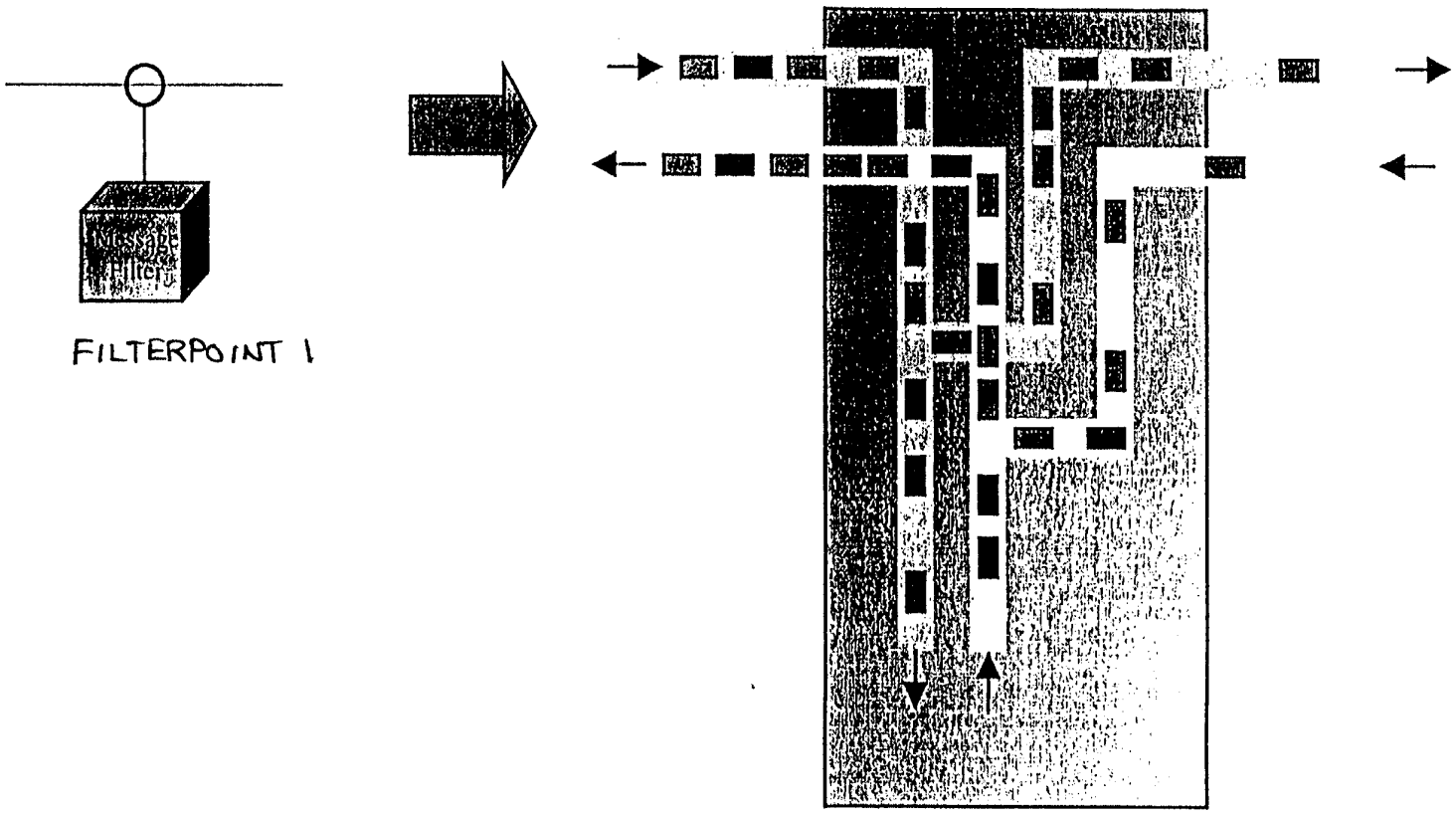
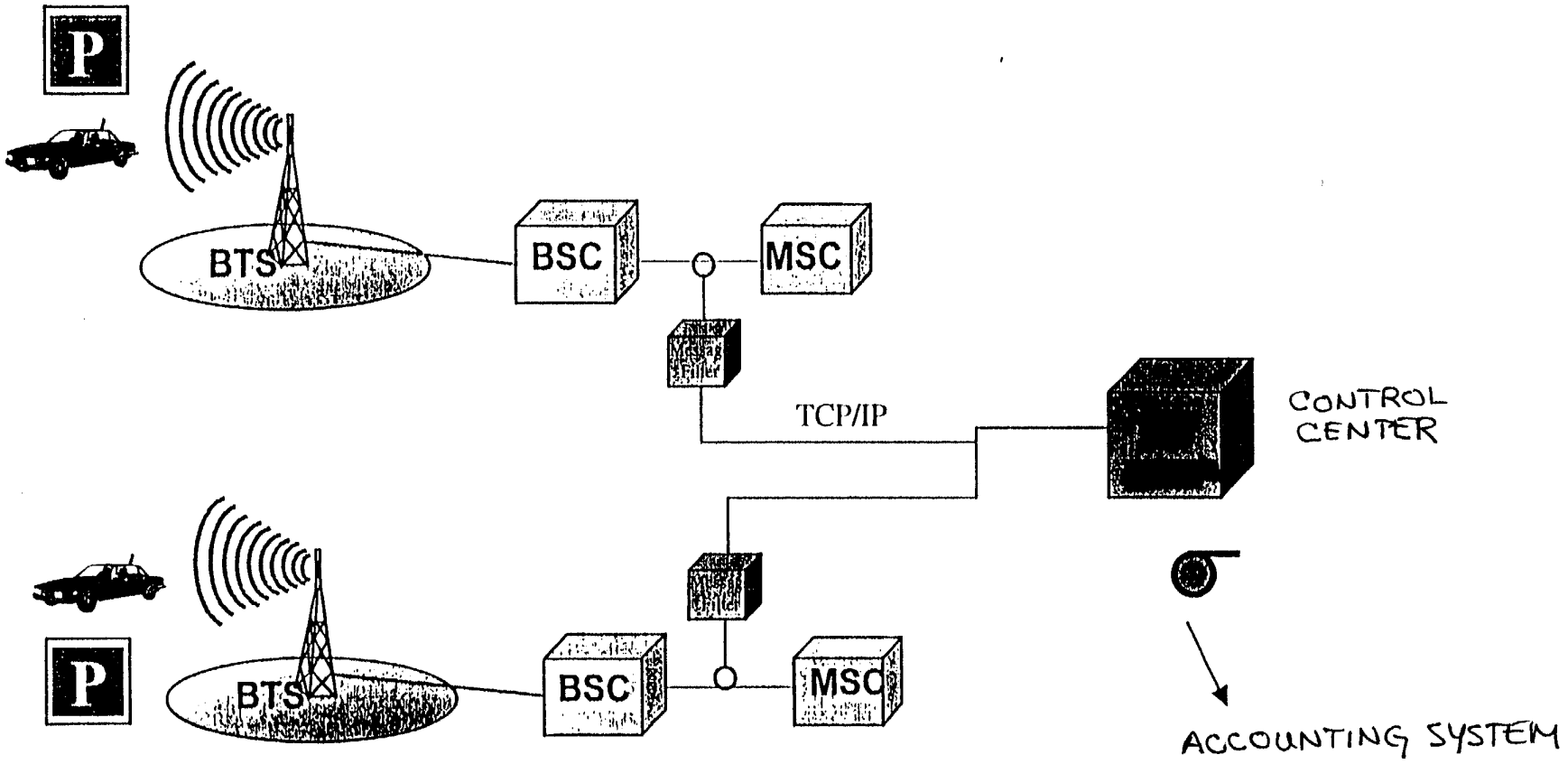


Fig. 2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BTS
BSC
MSC
TCP/IP
CONTROL CENTER
P
BTS
BSC
MSC
ACCOUNTING SYSTEM

Fig. 3

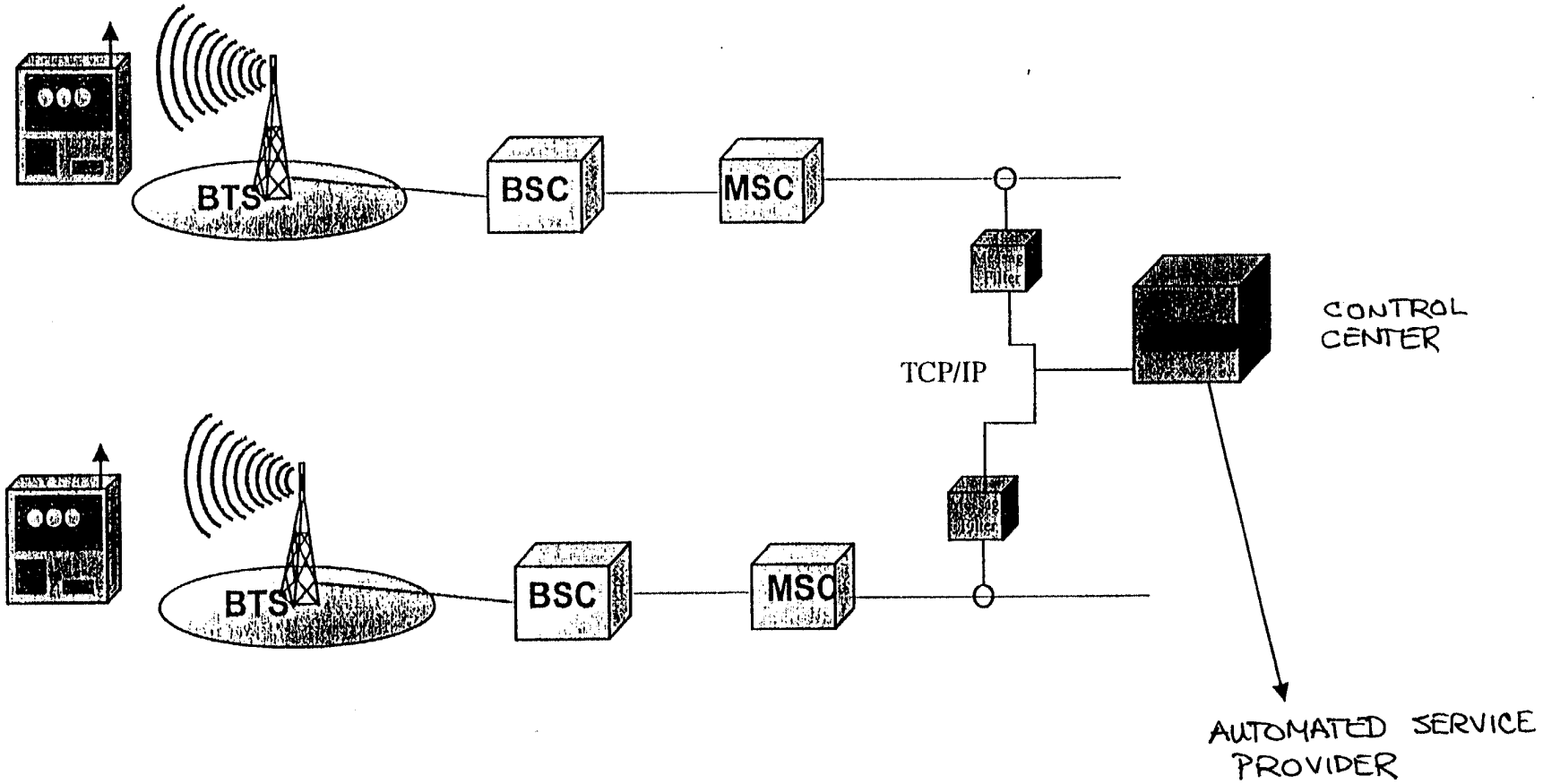
BTS
BSC
MSC
TCP/IP
CONTROL CENTER
BTS
BSC
MSC
AUTOMATED SERVICE PROVIDER

Fig. 4

Method And Arrangement For Controlling Facilities And/Or Processes Additionally Using Mobile Communication Networks

This invention relates to a method and an arrangement for controlling installations and/or processes in which parts of an existing mobile communication network are additionally used. In addition to the functioning of the mobile communication network, which is defined by standards, control information and signal information are transmitted over parts of the mobile communication network to permit execution of special applications in the sense of this invention.

The fields to be considered more closely here in the environment of this invention include the control of automatic vending machines by the user of the vending machine or remote maintenance or remote transmission of measurement data from installations to be monitored.

For a long time, it has been known that more or less successful experiments or projects have been conducted using the general GSM network infrastructure for system options. In particular, the following types of applications have been discussed publicly:

a) Micro-payment options: A mobile wireless customer uses his mobile station for cashless payment. The payment is made by sending an (authenticated) order from the mobile station to a central micro-payment office. The amounts that fall due are settled either as part of the mobile wireless bill or with a special bill for all micro-payment transactions.

b) Data use without a standard GSM subscription. This involves primarily applications in the area of monitoring, which transmit smaller volumes of data only occasionally. For these applications, the use of a standard GSM subscription, including a calling number, is not economical. An example that can be mentioned here is an automatic beverage vending machine, which sends instructions to the operator to restock it when the stock level drops below a defined threshold.

Re a):

A GSM-based micro-payment option should meet the following requirements:

–payment must be made rapidly,

–the option must be reliable with regard to both availability and quality, as well as in the area of security,

–network resources must not be heavily burdened,

–the man-machine interface (MMI) must be simple,

–it should be possible to use terminal devices available on the market.

Re b):

A data application without a standard GSM subscription should meet the following requirements:

–data transmission must be rapid,

–the option must be reliable in the area of availability and quality, as well as security,

–network resources must not be heavily burdened,

in particular, there should be

–no allocation of calling numbers to the mobile applications.

For these requirements, a mobile communication network in the traditional sense cannot be used satisfactorily because too many network resources are occupied and therefore these applications are not economically acceptable.

Therefore, the object of this invention is to provide a method which offers a technical solution that reduces the overall technical complexity and expenditure for these applications in the case of the known control methods and transmission methods, which are carried out with the help of a mobile communication network.

This object is achieved through the features of Patent Claims 1 and 12. Embodiments of the possible implementations are characterized in the respective subordinate claims.

The advantage of this invention is derived first, from the fact that, due to the partial additional use of an existing mobile communication network, the demand for investment for the special application is lower than in the case of an exclusive option. In addition, the cost burden on the mobile communication network is also reduced due to the additional use. When using commercial terminals for the special functions, which is the desired goal, acceptance by the user of the mobile communication network for such special services is especially high.

Examples of the use of the idea of this invention are given below:

When using a GSM network, communication from the mobile terminal or the corresponding application to the mobile communication network takes place by using information elements of the standardized signaling protocols. The messages or information elements used are filtered out of the signaling at suitable locations in the GSM network and transferred to a dedicated network (e.g., TCP/IP). In the dedicated network (hereinafter referred to as an applications network), the message/information elements are relayed further to an applications computer. It is also conceivable to use a central applications computer which covers certain regions or is responsible for certain applications. The applications computer can signal a response back to the mobile terminal within the same dialog.

In addition, the applications computer can autonomically establish a dialog with the mobile terminal.

Essentially all protocol elements, which are filled with any desired information by the terminal and can then be transmitted to the network, are suitable for transport from the mobile terminal to the network.

The Unstructured Supplementary Service Data procedure (USSD) which permits communication between a mobile wireless subscriber and the GSM network independently of calling is especially suitable.

In contrast with the standardized USSD procedure, it is proposed here that the USSD message be filtered out of the signaling flow to suitable locations.

Figure 1 shows the basic arrangement.

The signaling flow is <u>not</u> relayed transparently at the filter points, but instead the message and information elements affected are filtered out and inserted with a multiplexer according to the protocol. This object is implemented with a filter (message filter), as illustrated in Figure 2. However, the filter function need not take place at all levels of the protocol. Thus, for example, it is not absolutely necessary to filter out general functions such as identification, authentication

and encryption, but instead these functions can be carried out as usual to then filter out the authenticated dialog.

Two filter points are logically possible, first on the A interface and secondly, on the MAP interface. The essential features, as well as their advantages and disadvantages, are summarized below:

A interface:

- minimal burden on the GSM network infrastructure;
- no unnecessary time loss due to the processing time in the network;
- place-based data of the mobile terminal available and can thus be used in the application;
- number of the A interface in the network is relatively large => number of message filterslarge.

MAP interface:

- the filter function is also engaged for subscribers roaming outside the home network;
- the number of MAP interfaces is low relative to the number of A interfaces.

Overall arrangement

With an appropriate installation of message filters, the arrangement can be constructed and operated

- with area coverage (at all A interfaces or at all MAP interfaces with the HLR),
- regionally (selected A interfaces),
- depending on IMSI region (selected MAP interfaces with the HLR).

In all three cases, the installed message filters are connected to one or more applications computers via the applications network. In the applications computer, the messages are received, and analyzed, the required actions initiated and the corresponding acknowledgment is sent back to the mobile terminal.

This will now be illustrated on the basis of two examples.

Figure 3 shows the use of this invention for devices and processes on a public parking place. As an alternative to the usual payment of the parking fee at an automatic parking meter, the fees can also be paid via mobile wireless. To do so, the automobile driver sends a check-in message when he occupies the parking place and sends a check-out message when leaving the parking place. These messages are sent by entering and sending a USSD message (string of digits with "*" as the last character). The message includes a string of digits for "parking place: check-in message" and "parking place: check-out message" as well as the parking place number. The message is picked up by the message filter at the A interface and is transmitted together with the IMSI to the applications computer for identification of the customer and the cell ID for determination of the location.

The determination of location and the parking place number transmitted define uniquely a certain parking place in the service region. With the "check-in message" the parking place in question is listed with the status "properly occupied" in the applications computer. With the "check-out message" the parking place is released again, the parking time is determined and the amount due is sent to an accounting system (e.g., the mobile wireless accounting system).

During the parking time, parking monitors can determine by inquiry to the applications computer whether the parking place is "properly occupied."

Figure 4 shows as another example the use of the idea of this invention for control of a beverage vending machine.

A (simplified) GSM telephone is installed in the beverage vending machine which has been set up (publicly). In contrast with normal GSM telephones, this instrument must support only the USSD function. In principle, the IMSI used can also be used for other applications and automatic machines. It is not necessary to assign a calling number [address message] (MSISDN).

As soon as the stock level of a beverage drops below a predefined threshold, the beverage vending machine sends a USSD message. This message contains a code for the operator of the vending machine, a unique identifier of the vending machine and a code for the beverage in question. The message is picked up by the message filter on the MAP interface to the HLR and

sent to the applications computer. The operator of the vending machine is identified in the applications computer and notified.

Special case of the arrangement:
For the application case of "data use without a standard GSM subscription" (Example 2), a standard HLR can be omitted and instead a mini-HLR/AC function (e.g., location update, send authentication parameter) can be integrated into the message filter. IMSI can be reused for other vending machines and applications. It is not necessary to assign a calling number (MSISDN).

Patent Claims

1. A method of controlling installations and/or processes, characterized in that a mobile communication network is additionally used in part for transmission of respective information, and there is an exchange of information between the information flows within the mobile communication network and a dedicated network.

2. The method according to Claim 1, characterized in that the exchange of information takes place by filtering out information elements and inserting responses in the mobile communication signaling.[1]

3. The method according to Claim 1, characterized in that the exchange of information takes place by filtering out information elements in the mobile communication signaling and by inserting response signals.

4. The method according to one or more of Claims 1 through 3, characterized in that at least one of said information elements can be set independently by a terminal participating in the mobile communication.

5. The method according to one or more of Claims 1 through 4, characterized in that at least one of the standardized interfaces of the mobile communication network is used for the exchange of information.

6. The method according to one or more of Claims 1 through 5, characterized in that the A interface of a GSM or UMTS mobile communication network is used as the interface.

7. The method according to one or more of Claims 1 through 5, characterized in that the MAP interface of a GSM or UMTS mobile communication network is used as the interface.

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[1] Translator's note: The phrase "das Einfügen der Antworten" (inserting responses) appears in parentheses in the source text but this is not reproducible in coherent English; however, it may have been an error in the original (not included in the revised version of the claims).

8. The method according to one or more of Claims 1 through 7, characterized in that filter methods are used in the exchange of information.

9. The method according to one or more of Claims 1 through 8, characterized in that the information exchanged includes at least a subscriber identification.

10. The method according to one or more of Claims 1 through 8, characterized in that the information exchanged includes at least a location identification.

11. The method according to one or more of Claims 1 through 10, characterized in that the exchange of information takes place through a unit of the mobile communication network which has at least the function of a home location register and/or an authentication center.

12. An arrangement for controlling installations and/or processes, characterized in that a mobile communication network is additionally used for transmission of respective information, and arrangements for the exchange of information between the participating networks are present between a dedicated network and elements of the mobile communication network which are participating in the information flow within the mobile communication network.

13. The arrangement according to Claim 12, characterized in that at least one coupling device is provided which permits an exchange of information between at least one location in the mobile communication network and a location in the dedicated network.

14. The arrangement according to Claim 13, characterized in that said coupling device has devices which can select information elements directly or indirectly from the information flow of the mobile communication network or can directly or indirectly insert information elements into the information flow of the mobile communication network in a controlled manner or can replace corresponding elements from the information flow of the mobile communication network.

15. The arrangement according to one of Claims 13 or 14, characterized in that as a coupling point of the mobile communication network to the dedicated network in the mobile communication network, a unit is provided which has at least the function of a home location register and/or an authentication center.

Figure 1 [captions]

A_{bis} interface A interface MAP interface

[illegible?]

Filter point 1 Filter point 2

Figure 2. [caption] Filter point 1

Figure 3. [caption] Accounting system

Figure 4. [caption] Vending machine operator

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY
(Includes Reference to PCT International Applications)

ATTORNEY'S DOCKET NUMBER
740-63 (LAM)

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:
"METHOD AND ARRANGEMENT FOR CONTROLLING FACILITIES AND/OR PROCESSES ADDITIONALLY USING MOBILE COMMUNICATIONS"

the specification of which (check only one item below):

___ is attached hereto.

___ was filed as United States application
Serial No. _____
on _____
and was amended
on _____ (if applicable).

__X__ was filed as PCT international application
Number PCT/DE00/01557
on 18 May 2000
and was amended under PCT Article 19
on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations §1.56(a).

I hereby claim foreign priority benefit under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

COUNTRY (If PCT indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 USC 119
Germany	199 22 667.9	18 May 1999	X YES ___ NO
PCT	PCT/DE00/01557	18 May 2000	x YES ___ NO
			___ YES ___ NO
			___ YES ___ NO
			___ YES ___ NO

Combined Declaration for Patent Application and Power of Attorney (Continued)
(Includes Reference to PCT International Applications)

ATTORNEY'S DOCKET NUMBER 740-63

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application.

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:

U.S. APPLICATIONS		STATUS (MARK ONE)		
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED

PCT APPLICATIONS DESIGNATING THE U.S.					
PCT APPLICATION NO.	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED *(if any)*			
DE/00/01557	18 May 2000				

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X ADDITIONAL INVENTOR INFORMATION ATTACHED

I hereby declare that all statements made herein are of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any issuing thereon.

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